Professional Stereo Sound Cards





User's manual



# For technical support, please contact your system supplier.



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User's Manual

# **Table of Contents**

INFORMATION FOR THE USER	
IMPORTANT NOTICE	
CONTENTS OF THIS PACKAGE	6
FEATURES	6
Main hardware features	
PCX924v2 and PCX924-Mic	
PCX924-Mic additional hardware features	
PCX22v2	
Main software features	
PCX924 <sub>v2</sub> and PCX924-Mic	
PCX22 <sub>v2</sub>	
PCX924-Mic additional software features	
PCX924v2 and PCX22v2 optional software features	
HARDWARE REQUIREMENTS	
Minimum requirements	
SOFTWARE REQUIREMENTS	
Supported operating systems	
HARDWARE INSTALLATION	
Installing the card	
Interrupt and memory address	9
SOFTWARE INSTALLATION	10
Installation under Windows 98 SE and Millennium	
Removing the driver under Windows 98 SE and Millennium	
Installation under Windows 2000 and XP	12
Removing the driver under Windows 2000 and XP	13
HOW TO CHECK THE INSTALLATION	14
SPECIFICATIONS	15
CONFIGURATION (all cards)	15
INPUTS / OUTPUTS (PCX924v2 and PCX924-Mic)	15
INPUTS / OUTPUTS (PCX22v2)	16
AUDIO SPECIFICATIONS	
PCX924-Mic SPECIAL FEATURES	
PERFORMANCE	
PCX924 <sub>v2</sub> & PCX924-Mic:	
PCX 2 2 v 2	17

4 <i>F</i>	PPENDICES	18
	SCHEMATIC DIAGRAM PCX924-Mic	18
	SCHEMATIC DIAGRAM PCX924v2	18
	SCHEMATIC DIAGRAM PCX22v2	18
	Layout PCX924v2 & PCX924-Mic	19
	Layout PCX22v2	19
	Switches	
	Connectors	. 20
	PCX924-Mic ANALOG CABLE DIAGRAM	21
	Wiring Diagram – Analog Cable PCX924-Mic	21
	PCX924v2 ANALOG CABLE DIAGRAM	22
	Wiring Diagram – Analog Cable PCX924v2	22
	DIGITAL CABLE with GPIOs (PCX924-Mic & PCX924v2)	
	DIGITAL CABLE without GPIOs (PCX924-Mic & PCX924v2)	
	Wiring Diagram — Digital Cable with GPIOs (PCX924-Mic & PCX924v2)	24
	Wiring Diagram – Digital Cable without GPIOs (PCX924-Mic & PCX924v2)	24
	PCX924-Mic CABLE PINOUT	
	PCX924 <sub>v2</sub> CABLE PINOUT	
	PCX22v2 ANALOG CABLE DIAGRAM	
	Wiring Diagram — Analog Cable PCX22 <sub>v2</sub>	
	PCX22v2 DIGITAL CABLE with GPIOs	
	PCX22v2 DIGITAL CABLE without GPIOs	
	Wiring Diagram – Digital Cable with GPIOs (PCX22v2)	
	Wiring Diagram – Digital Cable without GPIOs (PCX22v2)	
	PCX22v2 CABLE PINOUT	28

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User's Manual

#### INFORMATION FOR THE USER

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a CLASS B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions contained in this data sheet, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- \* reorient or relocate the receiving antenna
- \* increase the separation between the equipment and the receiver
- \* connect the equipment into an outlet on a circuit different from that of the receiver
- \* consult the dealer or an experienced audio television technician.

#### Note:

Connecting this device to peripheral devices that do not comply with CLASS B requirements or using an unshielded peripheral data cable could also result in harmful interference to radio or television reception. The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

## **IMPORTANT NOTICE**

This card has been tested and found to comply with the following standards:

- International: CISPR22 Class B.
- Europe: EMC 89/336/CEE (1992) specifications.
- United States: FCC Rules-Part 15-Class B (digital device).

In order to guarantee compliance with the above standards in an installation, the following must be done:

- the provided cables must not be modified.
- additional cables used must have their respective shield connected to each extremity.

#### CONTENTS OF THIS PACKAGE

Thank you for purchasing a Digigram PCX924 or PCX22v2 card.

The package consists of the following components:

- \* a PCX924v2, PCX924-Mic, or PCX22v2 sound card,
- \* the User's Manual at hand.

The cables (optional) are delivered separately.

#### **FEATURES**

PCX924v2, PCX924-Mic, and PCX22v2 are audio cards for PCI bus. They are 'Universal PCI 32-bit/33 MHz', which means they can be plugged in 5 V PCI slots as well as in 3.3 V keyed PCI slots. The cards are also compatible with PCI-X interfaces.

#### Main hardware features

#### PCX924v2 and PCX924-Mic

- 2 balanced analog mono line inputs, with:
  - Software programmable analog and digital gain
  - Input impedance selection (600  $\Omega,>$  10  $K\Omega)$  via switches on the card (see top cover of the card)
- 2 servo-balanced\* analog mono line outputs, with software programmable analog and digital gain
- 1 digital AES/EBU\*\* stereo input, for synchronization
- 1 digital AES/EBU\*\* stereo input, for digital data only These two AES/EBU inputs allow:
  - recording of a digital signal on the AES/EBU synchronization input
  - recording of a digital signal on the AES/EBU data input, synchronized on a digital clock connected to the AES/EBU synchronization input.
  - synchronization of analog record/playback on an AES/EBU clock

The selection of the digital input for recording excludes the selection of the analog inputs.

1 digital AES/EBU\*\* stereo output
 Always plays the digital version of the analog outputs 1 and 2.

<sup>\*</sup> Electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines

<sup>\*\*</sup> can be used as S/PDIF interface as well

# User's Manual

- 1 CD-ROM input
- 1 SMPTE-LTC (longitudinal time code) input
- Variable programmable sampling clock, from 8 kHz to 50 kHz.
- 1 mini jack headphone stereo output (This output is in parallel of the analog outputs 1 and 2)
- 2 General Purpose inputs and 2 outputs (GPIOs)
- Inter-card synchronization connector
   If this connector is not used, synchro switches must be ON.
   If it is used, one of the connected cards must have the synchro switches ON, all the other linked cards must have the switches OFF.

#### PCX924-Mic additional hardware features

 1 microphone input with switchable 48 V phantom power, and analog expander/compressor/limiter
 This input and the line input are mixed together before analog to digital conversion.

#### PCX22v2

- 2 servo-balanced\* analog mono line outputs, with software programmable analog and digital gain
- 1 digital AES/EBU\*\* synchronization input
- 1 digital AES/EBU\*\* stereo output (Always plays the digital version of the analog outputs 1 and 2)
- 1 mini jack headphone stereo output (This output is in parallel of the analog outputs 1 and 2)
- 2 General Purpose inputs and 2 outputs (GPIOs)
- Inter-card synchronization connector
   If this connector is not used, synchro switches must be ON.
   If it is used, one of the connected cards must have the synchro switches ON, all the other linked cards must have the switches OFF.

#### Main software features

#### PCX924v2 and PCX924-Mic

- Decoding and mixing of several PCM (8, 16 and 24 bits) and MPEG Audio streams (Layer 1, II & III)
- Real-time, simultaneous record and playback in PCM (8, 16 and 24 bits) as well as in MPEG Audio layer I and layer II

7

<sup>\*</sup> Electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines

<sup>\*\*</sup> can be used as S/PDIF interface as well

- When using the np SDK:
  - panning, cross-fades, punch-in/punch-out, scrubbing, timestretching, pitch-shifting, format and frequency conversions
  - inter-board synchronization of multiple PCX924 cards in one PC
  - synchronization via an LTC (SMPTE) time code input

#### PCX22v2

- Decoding and mixing of several PCM (8, 16 and 24 bits) and MPEG Audio streams (Layer 1, II & III)
- When using the np SDK:
  - panning, cross-fades, scrubbing, time-stretching, pitch-shifting, format and frequency conversions

#### PCX924-Mic additional software features

- Software control of the microphone input: gain, 48 V switch, analog compressor-limiter-expander parameters
- Additional 24-bit DSP effects on the output in playback:
   3-band parametric equalizer and Maximizer

# PCX924v2 and PCX22v2optional software features

Additional 24-bit DSP effects on the output in playback:
 3-band parametric equalizer and Maximizer

## HARDWARE REQUIREMENTS

PCX924v2, PCX924-Mic, and PCX22v2 cards have been developed for IBM and IBM-compatible PC systems.

## Minimum requirements

- Pentium III minimum (or equivalent)
- 128 MB RAM
- One free PCI slot (5 V or 3.3 V)

## **SOFTWARE REQUIREMENTS**

To use your PCX924v2 or PCX22v2 card, you have to install the driver from the np Runtime package version 6.01 or higher.

The PCX924-Mic requires the installation of np Runtime version 6.30 or higher.

These packages also include a Wave driver that may be installed so that the card can be used with standard multimedia applications.

User's Manual

## Supported operating systems

PCX924v2 and PCX22v2 cards run under Windows 98 (SE and Millennium), Windows 2000, and Windows XP, the PCX924-Mic under Windows 2000 and Windows XP only.

#### HARDWARE INSTALLATION

Note:

*Under Windows 2000 and XP, the card has to be installed in the computer prior to installing its driver.* 

*Under* Windows 9x, first install the driver, and then insert the card.

## Installing the card

Gently plug the card in a free PCI slot and press it down to position it firmly. Tighten the screw.

#### Interrupt and memory address

Hardware interrupt and addresses are automatically set up at start-up by the PCI PnP BIOS.

#### WARNING

The PCX924-Mic includes a microphone pre-amplifier, which is sensitive to electro-magnetic perturbations.

In order to avoid spurious noise when using the microphone input, we recommend not to install the PCX924-Mic close to another card equipped with a fan. If this happens try to have some free slots between the two cards.

#### SOFTWARE INSTALLATION

Please visit the Digigram web site at **www.digigram.com** for the most recent driver.

In case you run a specific application developed or installed by a Digigram Partner, it might require the use of a specific driver version. In this case, make sure that the updated driver has been approved by your supplier.

#### Installation under Windows 98 SE and Millennium

If the driver has been downloaded from our web site, it has to be expanded prior to the driver's installation as follows: double-click on the downloaded file (self-expanding). You can use the default destination location (Windows temporary folder) or select another directory.

- From this directory, run *setup.exe* to install the driver.
- The License Agreement window appears: read it, and click on **Yes** to approve it. Do the same for the **Read Me First** window.
- Choose the destination folder where Setup will install the files. By default files are stored in \(\pi\con \text{Next}\).
- Check the option "driver for the second group of boards", and check the associated option "Wave" if you want to also install the Wave driver. Click on Next.
- As some components of Virtual PCX are installed, a license agreement of Virtual PCX is displayed. Read it and click on Yes to continue the installation.
- Select the program folder where the program icons will be added. Click on Next.
- Click on Next to start copying the files.
- If you have selected the Wave driver:
  - The information window about the Wave driver installation appears, and the system updates its drivers list.
  - In the window to select the manufacturer, click on Have disk
  - Browse to the destination folder \npdrv2\Wave and click **OK**.
  - Click **OK** in the following windows.
  - The "Digigram Wave for np..." item is selected. Click on Finish.
  - Click Next in the information window about the Wave driver installation.
- In the "**Digigram drivers**" window, select the number and the size of buffers required by your applications. Click on **Ok**.

# User's Manual

- In the **InstallShield Wizard Complete** window, select 'Yes, I want to restart my computer now' and click on **Finish** to complete the driver installation. Instead of letting your computer reboot you should shutdown your computer.
- Shut down your computer and insert the PCX924v2 or PCX22v2 card.
- Restart your computer.

The system automatically detects the card and finds the driver.

**Note:** If you have already installed the card and its driver, but without the Wave driver, and you now want to install the Wave driver, please proceed as follows:

- Open the Windows Control Panel and double-click on the Add/Remove Software icon.
- Select "Digigram np Runtime ...", and Next.
- Select Modify in the np Runtime window.
- Select the Wave option for the second group of boards. Next.
- Follow the instructions and reboot.

# Removing the driver under Windows 98 SE and Millennium

If the Wave driver is installed, remove it from *<Start> <Settings> <Control panel> <system> <device manager> <sound, video and games controllers>.* Then proceed as follows:

- Go to <Start> <Settings> <Control panel> <Add/Remove Programs>.
- Select the 'Digigram np Runtime...' and remove it.
- Follow the instructions of the InstallShield wizard.

#### Installation under Windows 2000 and XP

If the driver has been downloaded from our web site, it has to be expanded prior to the driver's installation as follows: double-click on the downloaded file (self-expanding). You can use the default destination location (Windows temporary folder) or select another directory.

- Shut down your computer and insert your PCX card.
- Restart your computer.
- Click on Cancel if the Found New Hardware Wizard appears.
- Double-click on the **setup.exe** icon to launch the driver installation.
- The License Agreement window appears: read it, and click on Yes to approve it. Do the same for the Read Me First window.
- Choose the destination folder where Setup will install the application files (\(\psi\_cxnp\) by default). Note that the driver files are installed in \(\windows\)\(\si\_system 32\)\(\Digitimes\)\(\Digimes\)\(\Digitimes\)\(\Digiti
- Check the option "driver for the second group of boards", and check the associated option "Wave" if you want to also install the Wave driver. Click on Next.
- As some components of Virtual PCX are installed, a license agreement of Virtual PCX is displayed. Read it and click on Yes to continue the installation.
- Select the program folder where the program icons will be added.
   Click on Next.
- Click on **Next** to start copying the files.
- Click on Continue anyway in the Hardware installation window (Windows XP).
- In the "Digigram drivers" window, select the number and the size
  of buffers required by your applications. Click on Ok.
- In the "InstallShield Wizard Complete" window, select 'Yes, I want to restart my computer now' and click on Finish to complete the driver installation.

# User's Manual

**Note:** If you have done an installation previously without selecting the Wave driver, and you now want to install this driver, please proceed as follows:

- Open the Windows Control Panel and double-click on the Add/Remove Software icon.
- Select "Digigram np Runtime...", and Change/Remove.
- Select Modify in the np Runtime window. Next.
- Check the Wave option for the second group of boards. **Next**.
- Click on Continue anyway in the Hardware installation window (Windows XP).
- Click on **Finish** in the **Maintenance complete** window.

The Wave driver is now installed.

## Removing the driver under Windows 2000 and XP

- Open the Windows Control Panel and double-click on the Add/Remove Software icon.
- Select "Digigram np Runtime ...", and Change/Remove.
- Select "**Remove**" in the np Runtime window.
- Follow the instructions to finish to remove the driver.

#### How to check the installation

Once the driver and the cards are installed according to the procedure described in this manual, you can verify that the card is properly installed and works fine as follows:

- Go to <Start> <Programs> <Digigram> and select Digigram Control Center.
- In the Digigram drivers window, select the General Information tab.
  - In the Modules Information window, you can see the Np Runtime modules that have been installed and their versions.
- In the Digigram drivers window, select the NP Diagnostics tab. You should see here the icons of the cards you have installed.

If the card you have installed is listed:

- Right click on the icon of the card.
- Select Diagnostics, and Play sine. This plays in loop a sine Wave signal on the outputs of the card.
   You can also select Play file to play in loop a file of your choice
  - (PCM, MPEG layer 1, layer 2 or layer 3).
  - If the playback is correct, the card is correctly installed and works.
- To stop the playback, right click on the card icon, and select Stop Activities.

If the card is not displayed:

- make sure you have installed the second group of boards driver, from the np runtime installation.
- make sure that the card is correctly inserted in the PCI slot, and screwed on the PC chassis.
- if necessary, uninstall np runtime package as described in this manual, and re-install it.

If you have also installed the Wave driver, you should see the device in **Control panel**, **Sounds and multimedia**:

- Select the Audio tab.
- PCX924v2 OUT # 1 (PCX924-Mic OUT #1, PCX22v2 OUT # 1) is listed in Sound playback, preferred device,
   PCX924v2 IN #1 (PCX924-Mic IN #1, PCX924v2 IN # 1) is listed in Sound recording, preferred device.
- Check from a multimedia application that you can use the card.

You can also check in the **Digigram Control Center** that the Wave driver for the second group of boards is detected: select the **Wave NP** tab.

User's Manual

## **SPECIFICATIONS**

## **CONFIGURATION** (all cards)

Bus/Format	PCI slave mode
Size	175 mm × 99 mm
Digital Signal Processor	56303 at 100 MHz
Power requirements (+3.3V / +5V / +12V / -12V)	0.5 A / 0.1 A / 0.2 A / 0.1 A
Operating: temp / humidity (non-condensing)	0°C / +50°C • 5% / 90%
Storage: temp / humidity (non-condensing)	-5°C / +70°C • 0% / 95%

# INPUTS / OUTPUTS (PCX924v2 and PCX924-Mic)

Analog line inputs (mono)	2 balanced*
Maximum input/impedance	+22 dBu/>10kΩ
Programmable input gain	digital and analog
Digital inputs (stereo)	1 AES/EBU**
Other inputs	LTC, CD-ROM (+10 dBu), 2 GPI (dry contact)
Analog outputs (mono)	2 servo-balanced***
Maximum output/impedance	+22 dBu/low impedance
Programmable output gain	digital and analog
Digital outputs (stereo)	1 AES/EBU**
Other outputs	headphone (600 Ω), two GPO (relay, 0.5A, 48 VCC)
Access to main status bits of digital frame	Yes
AES11 synchronization	Yes
Connectors	15-pin Sub-D for analog I/O; 15-pin HD Sub-D for digital I/O, sync., and GPIO; headphone jack 3'5 (female TRS 3,5 mm)

<sup>\*</sup>can be used with unbalanced signals

<sup>\*\*</sup> can be used as S/PDIF interface as well

<sup>\*\*\*</sup> electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines

## INPUTS / OUTPUTS (PCX22v2)

Inputs	2 GPI (dry contact)
Analog line outputs (mono)	2 servo-balanced*
Maximum output/impedance	+22 dBu/low impedance
Programmable output gain	digital and analog
Digital outputs (stereo)	1 AES/EBU**
Other outputs	headphone (600 $\Omega$ ), two GPO (relay, 0.5A, 48 VCC)
Access to main status bits of digital frame	Yes
Connectors	15-pin Sub-D for analog Outputs; 15-pin HD Sub-D for digital Output; Sync., and GPIO; headphone jack (female TRS 3,5 mm)

#### **AUDIO SPECIFICATIONS**

Sampling frequencies available	Programmable from 8 to 50 kHz
A/D and D/A converter resolution	24 bits
Frequency response	20 Hz–20 kHz: ±0.2 dB
Signal to noise ratio	>97 dB
Distortion + noise at 1 kHz	<-92 dB (0.0025 %)
Channel phase difference: 20 Hz/20 kHz	<0.5°/2°
Analog channel cross talk at 1 kHz	<-115 dB

Note:

All measurements are done at Fs=48 kHz, in rec+play mode. Results are unweighted.

electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines

<sup>\*\*</sup> can be used as S/PDIF interface as well

User's Manual

#### **PCX924-Mic SPECIAL FEATURES**

Number of mic inputs	1 with 48 V phantom power supply
Programmable mic gain	0 to 66 dB in 0.5 dB steps
Maximum input level/impedance	+10 dBu/2 kΩ
E.I.N. A/D-D/A at 48kHz, G=60 dB	<-125 dBu
Programmable noise-gate threshold	-52 dB, -42 dB, -32 dB
Programmable compressor/limiter threshold	From –26 dB to 0 dB
Programmable compressor ratio	1, 1.5, 1.8, 2, 3, 4
Programmable compressor/limiter gain	From 0 to 16 dB
Limiter ratio	15:1
Compressor/limiter release time	150 ms
Management of line and mic inputs	Mixed together before A/D conversion, with independent level and mute controls
Programmable DSP effects on the output	3-band parametric equalizer, maximizer

#### **PERFORMANCE**

Maximum audio streams played at 48 kHz without effects, through np SDK

#### PCX924<sub>v2</sub> & PCX924-Mic:

PCM 16 bits, play only	20 mono / 10 stereo
PCM 16 bit, play+record	12 mono / 6 stereo
MPEG Audio Layer II*, play only	20 mono / 20 stereo
MPEG Audio Layer II*, play + record	20 mono / 20 stereo
MPEG Audio Layer III*, play only	8 mono / 4 stereo

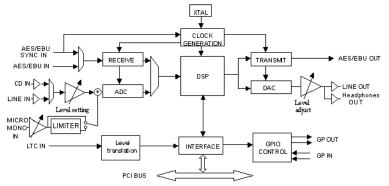
#### PCX22<sub>v2</sub>

PCM 16 bits	20 mono / 10 stereo
MPEG Audio Layer II*	20 mono / 20 stereo
MPEG Audio Layer III*	8 mono / 4 stereo

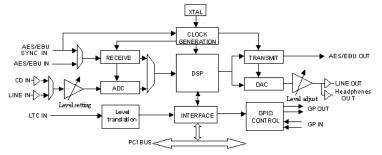
<sup>\* 128</sup> Kbits/s mono, 256 Kbits/s stereo

## **APPENDICES**

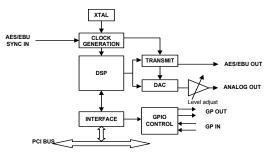
#### **SCHEMATIC DIAGRAM PCX924-Mic**



#### SCHEMATIC DIAGRAM PCX924v2

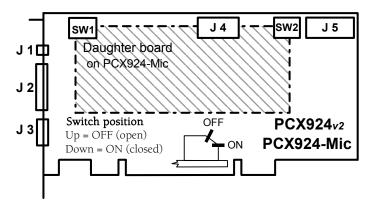


## SCHEMATIC DIAGRAM PCX22v2

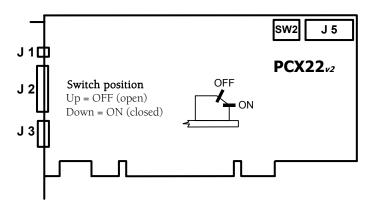


User's Manual

# Layout PCX924v2 & PCX924-Mic



# Layout PCX22v2



## **Switches**

## SW1 - Input impedance

(both levers must be set together)

Position	Input impedance
OFF	> 10 kΩ
ON	600 Ω

# **SW2 – Inter-board synchronization** (both levers must be set together)

Position	Status
OFF	Slave
ON	Master

#### **Connectors**

#### J1: Headphone

(3.5 mm TRS female jack)

Contact	Signal
Sleeve	Ground
Tip	Left channel
Ring	Right channel

J2: Analog cable

J3: Digital cable

## J4: CD Input

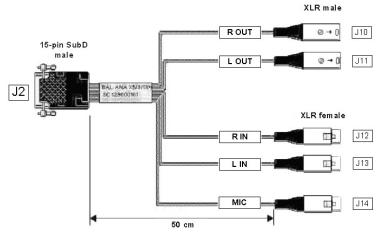
Position	Signal
1	Left
2, 3	Ground
4	Right

J5: Inter-card synchronization connector

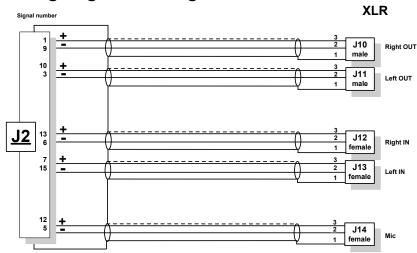
User's Manual

# PCX924-Mic ANALOG CABLE DIAGRAM

Schematic diagram of the cable delivered by Digigram\*:

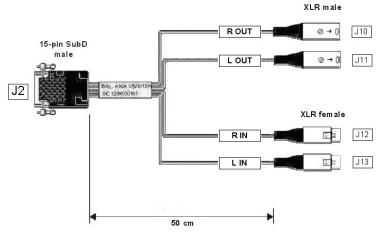


## Wiring Diagram - Analog Cable PCX924-Mic

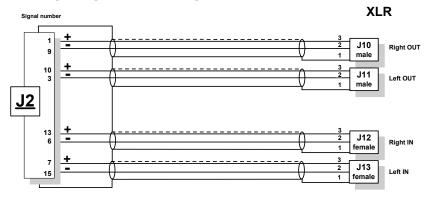


## PCX924v2 ANALOG CABLE DIAGRAM

Schematic diagram of the cable delivered by Digigram\*:



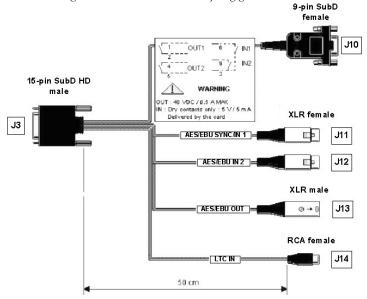
# Wiring Diagram - Analog Cable PCX924v2



User's Manual

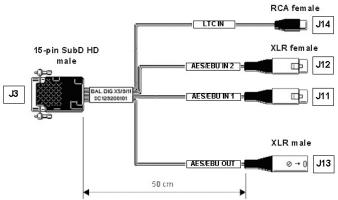
# DIGITAL CABLE with GPIOs (PCX924-Mic & PCX924-v2)

Schematic diagram of the cable delivered by Digigram\*:



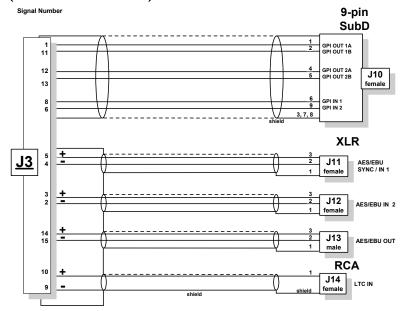
#### DIGITAL CABLE without GPIOs (PCX924-Mic & PCX924-v2)

Schematic diagram of the cable delivered by Digigram\*:

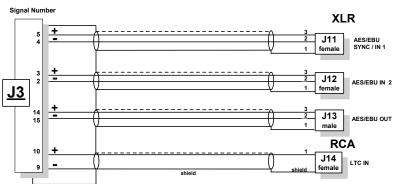


<sup>\*</sup> Your cable may look different if it is not a Digigram cable.

# Wiring Diagram – Digital Cable with GPIOs (PCX924-Mic & PCX924-v2)



# Wiring Diagram – Digital Cable without GPIOs (PCX924-Mic & PCX924-v2)



# User's Manual

## **PCX924-Mic CABLE PINOUT**

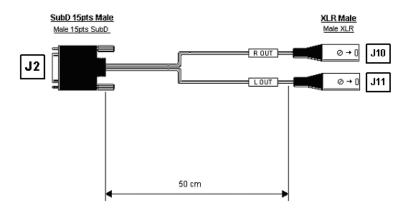
Pin #	ANALOG	DIGITAL
1	R OUT +	GPI OUT 1A
2	GND	AES/EBU IN 2-
3	L OUT -	AES/EBU IN 2+
4	GND	AES/EBU SYNC IN 1-
5	MIC IN -	AES/EBU SYNC IN 1+
6	R IN -	GPI INPUT 2
7	LIN+	GND/GPI INPUT COMMON
8	GND	GPI INPUT 1
9	R OUT -	GND
10	L OUT +	LTC IN
11	GND	GPI OUT 1B
12	MIC IN +	GPI OUT 2A
13	R IN +	GPI OUT 2B
14	GND	AES/EBU OUT +
15	LIN -	AES/EBU OUT -

## PCX924v2 CABLE PINOUT

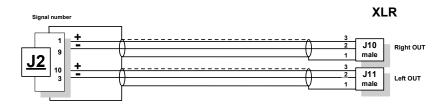
Pin #	ANALOG	DIGITAL
1	R OUT +	GPI OUT 1A
2	GND	AES/EBU IN 2-
3	L OUT -	AES/EBU IN 2+
4	GND	AES/EBU SYNC IN 1-
5	NC	AES/EBU SYNC IN 1+
6	R IN -	GPI INPUT 2
7	LIN+	GND/GPI INPUT COMMON
8	GND	GPI INPUT 1
9	R OUT -	GND
10	L OUT +	LTC IN
11	GND	GPI OUT 1B
12	NC	GPI OUT 2A
13	R IN +	GPI OUT 2B
14	GND	AES/EBU OUT +
15	L IN -	AES/EBU OUT -

## PCX22v2ANALOG CABLE DIAGRAM

Analog cable delivered by Digigram\*:



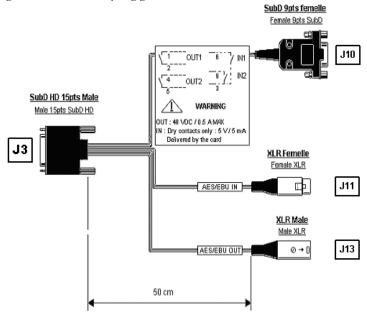
# Wiring Diagram - Analog Cable PCX22v2



User's Manual

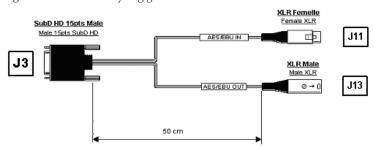
## PCX22v2DIGITAL CABLE with GPIOs

Digital cable delivered by Digigram\*:



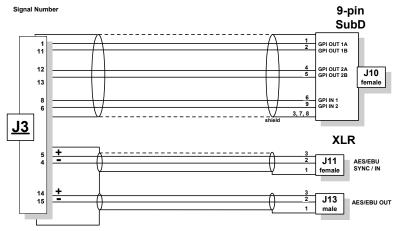
## PCX22v2DIGITAL CABLE without GPIOs

Digital cable delivered by Digigram\*:

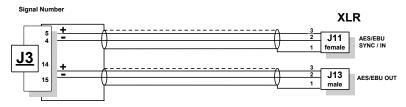


\* Your cable may look different if it is not a Digigram cable.

# Wiring Diagram - Digital Cable with GPIOs (PCX22v2)



# Wiring Diagram - Digital Cable without GPIOs (PCX22/2)



#### PCX22v2CABLE PINOUT

Pin #	ANALOG	DIGITAL	Pin#	ANALOG	DIGITAL
1	R OUT +	GPI OUT 1A	8	GND	GPI INPUT 1
2	GND	NC	9	R OUT -	GND
3	L OUT -	NC	10	L OUT +	NC
4	GND	AES/EBU SYNC IN 1-	11	GND	GPI OUT 1B
5	NC	AES/EBU SYNC IN 1+	12	NC	GPI OUT 2A
6	NC	GPI INPUT 2	13	NC	GPI OUT 2B
7	NC	GND/GPI INPUT	14	GND	AES/EBU OUT +
		COMMON	15	NC	AES/EBU OUT -

User's Manual

Your notes:	

# D i g i g r a m

Your notes:				